IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Steven A. Rogers		Atty. Docket No.:	006389.00004
Serial No.:	10/697,103	Group Art Unit:	2616
Filed:	October 31, 2003	Examiner:	Scheibel, Robert
For:	Endpoint Packet Scheduling System	Confirmation No.:	9000

RESPONSE TO OFFICE ACTION AND SUBMISSION OF TERMINAL DISCLAIMER

U.S. Patent and Trademark Office
Customer Service Window, **Mail Stop Amendment**
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

In response to the non-final Office Action mailed April 16, 2007, please amend the present application as follows:

Amendments to the Claims are reflected in the Listing of Claims, which begins on page 2 of this paper.

Remarks/Arguments begin on page 9 of this paper.

If any fees are required or if an overpayment is made, the Commissioner is authorized to debit or credit our Deposit Account No. 19-0733.

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of transmitting Internet Protocol (IP) or Ethernet packets over a packet-switched computer network, comprising the steps of:

(1) from a transmitting network endpoint ~~node~~, transmitting through the packet-switched computer network a query to an intended receiving network endpoint ~~node~~;

(2) receiving from the intended receiving network endpoint ~~node~~ a reception map indicating time slots during which transmission to the intended receiving network endpoint ~~node~~ would not conflict with other transmitting endpoints~~transmitters~~ and wherein the reception map is generated without schedule coordination among network resources;

(3) from the transmitting network endpoint~~node~~, transmitting to the intended receiving network endpoint a proposed transmission map indicating time slots, compatible with the reception map, during which the transmitting network endpoint ~~node~~ intends to transmit packets, wherein the proposed transmission map is generated without schedule coordination among network resources; and

(4) from the transmitting network endpoint ~~node~~, synchronously transmitting packets including packet headers to the intended receiving network endpoint ~~node~~ through the network according to the proposed transmission map without schedule coordination among network resources.

2. (Currently Amended) The method of claim 1, further comprising the steps of, prior to step (4), receiving an agreement from the intended receiving network endpoint ~~node~~ and, if no agreement is received, transmitting in step (4) according to an alternative transmission map.

3. (Currently Amended) The method of claim 2, wherein the alternative transmission map is proposed by the intended receiving network endpoint~~node~~.

4. (Currently Amended) The method of claim 1, wherein step (4) comprises the step of repeatedly transmitting packets to the intended receiving network endpoint ~~node~~ according to the proposed transmission map.

5. (Currently Amended) The method of claim 1, further comprising the step of, at the intended receiving network endpoint~~node~~, generating the reception map on the basis of previously allocated time slots from other transmitting network endpoints~~nodes~~.

6. (Original) The method of claim 5, wherein the reception map comprises a bitmap, wherein each bit corresponds to one of a plurality of timeslots, each bit indicating whether that corresponding timeslot has previously been allocated.

7. (Currently Amended) The method of claim 1, further comprising the step of periodically synchronizing, as between the transmitting network endpoint ~~node~~ and the receiving network endpoint~~node~~, a time period on which the proposed transmission map is used in step (4) and without synchronization among network resources.

8. (Currently Amended) The method of claim 7, wherein the synchronizing step comprises the step of using ~~an electrical~~ a connection over which a synchronization signal is transmitted, separate and apart from any network connection.

9. (Original) The method of claim 7, wherein the synchronizing step comprises the step of transmitting synchronization packets over the network.

10. (Currently Amended) A method of transmitting Internet Protocol (IP) or Ethernet packets over a packet-switched computer network, comprising the steps of:

(1) from a transmitting network endpoint~~node~~, transmitting a bandwidth requirement to an intended receiving network endpoint ~~node~~;

(2) receiving from the intended receiving network endpoint ~~node~~ a transmission map indicating time slots during which transmission to the intended receiving network endpoint ~~node~~ would not conflict with other transmitting network endpoints, ~~transmitters~~ wherein the transmission map is generated without schedule coordination among network resources; and

(3) from the transmitting network endpoint~~node~~, synchronously transmitting packets including packet headers to the intended receiving network endpoint ~~node~~ over the computer

network according to the transmission map without schedule coordination among network resources.

11. (Currently Amended) The method of claim 10, further comprising the step of, at the intended receiving network endpoint ~~node~~, generating the transmission map based on the bandwidth requirement transmitted from the transmitting network endpoint~~node~~.

12. (Currently Amended) The method of claim 10, further comprising the step of synchronizing between the transmitting network endpoint ~~node~~ and the intended receiving network endpoint ~~node~~ a time period on which the transmission map is used and without synchronization among network resources.

13. (Original) The method of claim 12, wherein the synchronizing step comprises the step of using an electrical connection over which a synchronization signal is transmitted, separate and apart from any network connection.

14. (Original) The method of claim 12, wherein the synchronizing step comprises the step of transmitting synchronization packets over the network.

15. (Currently Amended) A method of transmitting Internet Protocol (IP) or Ethernet packets over a packet-switched computer network, comprising the steps of:

(1) from a transmitting network endpoint~~node~~, transmitting through the packet-switched computer network a proposed delivery schedule to an intended receiving network endpoint~~node~~, wherein the proposed delivery schedule indicates time slots corresponding to times during which the transmitting network endpoint~~node~~ proposes to transmit packets to the intended receiving network endpoint~~node~~ and wherein the proposed delivery schedule is generated without schedule coordination among network resources;

(2) receiving from the intended receiving network endpoint~~node~~ an indication as to whether the proposed delivery schedule is acceptable to the intended receiving network endpoint~~node~~; and

(3) if the proposed delivery schedule is acceptable, synchronously transmitting packets

including packet headers from the transmitting network endpoint to the intended receiving network endpoint~~node~~ according to the proposed delivery schedule and without schedule coordination among network resources.

16. (Currently Amended) The method of claim 15, further comprising the step of, upon determining that the proposed delivery schedule is not acceptable to the intended receiving network endpoint~~node~~, receiving from the intended receiving network endpoint~~node~~ an alternate delivery schedule and using the alternate delivery schedule to transmit the packets in step (3).

17. (Currently Amended) The method of claim 15, further comprising the step of, at the intended receiving network endpoint~~node~~, determining whether the proposed delivery schedule is acceptable by comparing time slots proposed to be used by the transmitting network endpoint~~node~~ to previously allocated time slots allocated by other transmitting network endpoints~~transmitters~~.

18. (Currently Amended) The method of claim 15, further comprising the step of synchronizing between the transmitting network endpoint~~node~~ and the intended receiving network endpoint~~node~~ a time period on which the delivery schedule is used and without synchronization among network resources.

19. (Original) The method of claim 18, wherein the synchronizing step comprises the step of using an electrical connection over which a synchronization signal is transmitted, separate and apart from any network connection.

20. (Original) The method of claim 18, wherein the synchronizing step comprises the step of transmitting synchronization packets over the network.

21. (Currently Amended) A computer including a computer-readable medium having stored therein ~~programmed with~~ executable instructions that, when executed, perform the following steps:

(1) transmitting from an originating network endpoint over a packet-switched network to

an intended receiving network endpoint a proposed delivery schedule ~~to an intended receiving node~~, wherein the proposed delivery schedule indicates time slots corresponding to times during which the computer proposes to transmit packets to the intended receiving network endpoint~~node~~ and wherein the proposed delivery schedule is generated without schedule coordination among network resources;

(2) receiving from the intended receiving network endpoint~~node~~ an indication as to whether the proposed delivery schedule is acceptable to the intended receiving network endpoint~~node~~ and without schedule coordination among network resources; and

(3) if the proposed delivery schedule is acceptable to the intended receiving network endpoint~~node~~, synchronously transmitting Internet Protocol (IP) or Ethernet packets including packet headers to the intended receiving network endpoint~~node~~ over the computer network according to the proposed delivery schedule and without schedule coordination among network resources.

22. (Currently Amended) The computer according to claim 21, further comprising executable instructions that, when executed, perform the step of receiving from the intended receiving network endpoint~~node~~ an alternative delivery schedule and using the alternative delivery schedule as the basis for transmitting packets in step (3).

23. (Currently Amended) The computer according to claim 21, further comprising means for synchronizing the proposed delivery schedule with the intended receiving network endpoint ~~node~~ without synchronization among network resources.

24. (Currently Amended) The computer according to claim 23, wherein the means comprises a connection ~~wire~~ linked to the intended receiving network endpoint~~node~~, wherein the connection ~~wire~~ is separate from any network connection to the intended receiving network endpoint~~node~~.

25. (Currently Amended) The computer according to claim 23, wherein the means comprises computer instructions that process a synchronization packet transmitted over a network connection with the intended receiving network endpoint~~node~~.

26. (Currently Amended) A method of transmitting Internet Protocol (IP) or Ethernet packets over a network comprising at least one network switch ~~an Ethernet~~, comprising the ~~computer-implemented~~ steps of:

(1) from a transmitting network endpoint~~node~~, transmitting a query to an intended receiving network endpoint~~node~~ over the network;

(2) at the intended receiving network endpoint~~node~~, generating a reception map indicating which of a plurality of discrete time slots have been previously allocated for transmission of packets to that intended receiving network endpoint~~node~~, wherein each time slot represents a unit of time within a transmission interval over the network~~Ethernet~~, and wherein the reception map is generated without schedule coordination with the at least one network switch;

(3) transmitting the reception map from the intended receiving network endpoint~~node~~ to the transmitting network endpoint~~node~~;

(4) from the transmitting network endpoint~~node~~, transmitting to the intended receiving network endpoint~~node~~ a proposed transmission map indicating time slots, compatible with the reception map, during which the transmitting node intends to transmit packets to the intended receiving network endpoint node over the network~~Ethernet~~, wherein the proposed transmission map is generated without schedule coordination with the at least one network switch;

(5) from the transmitting network endpoint~~node~~, synchronously transmitting through the at least one network switch packets including packet headers to the intended receiving network endpoint ~~node~~ according to the proposed transmission map; and

(6) maintaining time synchronization as to the discrete time slots between the transmitting network endpoint~~node~~ and the receiving network endpoint ~~node~~ through the use of an electrical connection that is separate and apart from any network connection between the transmitting network endpoint ~~node~~ and the intended receiving network endpoint~~node~~ and without schedule synchronization with the at least one network switch.

27. (New) The method of claim 1, wherein steps (1) through (4) are performed over a packet-switched network comprising a plurality of network switches, and wherein steps (2) through (4) are performed without schedule coordination among the plurality of network switches.

28. (New) The method of claim 10, wherein steps (1) through (3) are performed over a packet-switched network comprising a plurality of network switches, and wherein steps (2) and (3) are performed without schedule coordination among the plurality of network switches.

29. (New) The method of claim 15, wherein steps (1) through (3) are performed over a packet-switched network comprising a plurality of network switches, and wherein steps (2) and (3) are performed without schedule coordination among the plurality of network switches.

30. (New) The computer of claim 21, wherein steps (1) through (3) are performed over a packet-switched network comprising a plurality of network switches, and wherein steps (1) through (3) are performed without schedule coordination among the plurality of network switches.

31 (New) The method of claim 26, wherein steps (2) through (6) are performed over a packet-switched network comprising a plurality of network switches and without schedule coordination among the plurality of network switches.

REMARKS

The non-final Office Action of April 16, 2007 has been carefully reviewed and these remarks are responsive thereto. Claims 1-31 are pending. Claims 1, 3-5, 7-8, 10-12, 15-18, and 21-26 have been amended herein. New claims 27-31 have been added.

Rejections Under 35 U.S.C. § 101

Claims 15, 21, and 26 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. According to the office action, independent claim 21 is directed to "functional descriptive matter (software) that has not been functionally embodied in a computer readable medium." The office action also states that claim 15 is drawn to a method pertaining to software that is not functionally embodied on a computer readable medium. And claim 26 was rejected because it includes the phrase "computer-implemented steps" which indicates that the claim is drawn to functional descriptive matter (software) that has not been functionally embodied in a computer readable medium. The office action refers to pages 52-54 of the Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility.

As to independent claim 21, which clearly recites "A computer programmed with executable instructions," Applicant notes that page 53 of the Interim Guidelines states that "USPTO personnel should determine whether the computer program is being claimed as part of an otherwise statutory manufacture or machine. In such a case, the claim remains statutory irrespective of the fact that a computer program is included in the claim." Consequently, Applicant has not claimed a computer program per se but instead has claimed a statutory apparatus ("a computer") that has been programmed to carry out certain steps. Nevertheless, in the interest of advancing prosecution, independent claim 21 has been amended to also recite a "computer-readable medium having stored therein executable instructions which when executed perform the following steps" as suggested in the office action.

As to independent claim 15, the office action suggests that the recited method steps "pertain to software which is not functionally embodied in a computer readable medium." Applicant respectfully disagrees, and points out that claim 15 is a method (process) claim, which is clearly one of the four statutory categories of invention provided for under 35 U.S.C. § 101. The recited steps are not "computer listings per se" or any other type of prohibited subject matter.

Page 54 of the Interim Guidelines clearly states that, "When a computer program is claimed in a process where the computer is executing the computer program's instructions, USPTO personnel should treat the claim as a process claim." Consequently, the rejection of claim 15 is improper.

Regarding independent claim 26, which like claim 15 recites a statutory process, the office action suggests that the claim is nonstatutory because it refers to "computer-implemented steps." Although claim 26 is clearly statutory for the same reasons as claim 15, Applicant has removed the phrase "computer-implemented steps" as suggested in the office action, thus broadening the scope of the claim. This rejection is therefore believed to be moot.

Obviousness-Type Double Patenting

Claims 1, 10, 15, and 21 stand provisionally rejected for obviousness-type double patenting over claims in pending application number 11/233,144 (entitled "Compressed Video Packet Scheduling System"), also assigned to the assignee of the present application. Applicant has submitted herewith a terminal disclaimer, which obviates this rejection.

Rejections Under 35 U.S.C. §§ 102 & 103

Claims 1-5 and 7-26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,611,519 to Howe. Dependent claim 6 stands rejected under 35 U.S.C. § 103 as being obvious over Howe in view of U.S. Patent No. 6,657,959 to Chong et al. Page 10 of the office action states that the present application names joint inventors. Applicant points out that there is only a single applicant, Steven A. Rogers, for this pending application.

All independent claims (claims 1, 10, 15, 21, and 26) have been amended to clearly recite that the coordinated scheduling of packets occurs between network endpoints on the network, not network elements within the network, and without schedule coordination among network resources. As explained in paragraph 8 of the current patent specification, "Because the schedule is determined by the two endpoints, no network arbiter is needed to coordinate among network resources." This has the beneficial effect of avoiding expense and extra specialized equipment to coordinate schedules among network elements. In contrast, in Howe the network endpoints do not negotiate the scheduling of packets; such scheduling is instead performed by all of the network elements, including the edge nodes and middle nodes in the network, thus requiring coordination among network switches (see Howe FIGS. 2, 3, 4, 37, 43). Consequently, Howe suffers from the disadvantage of requiring complicated and expensive changes to the network architecture in order to carry out packet scheduling, whereas the claimed method involves only

coordination between the network endpoints. See also Howe at col. 10 lines 35-50, explaining how intermediate nodes must collectively coordinate their schedules to provide scheduling of packets through the network, and column 4 at lines 27-40 (explaining how all the network devices on the "scheduled" packet path must switch their input and output lines to bypass the standard store-and-forward switches and switch open a direct non-blocking non-delaying layer one physical connection from one end of the network to the other). See also Howe FIG. 35 (steps following "Is this a Call Setup Message?") and FIG. 38 (illustrating criticality of timing among network elements, including accounting for delays).

All independent claims (claims 1, 10, 15, 21, and 26) have also been amended to recite that Ethernet or IP packets (i.e., Layers 2 or 3 respectively) having packet headers are transmitted through the network. In contrast, Howe only schedules delivery of "headerless" data. As seen in FIG. 13 of Howe, conventional (non-scheduled) packets are handled by element 100 at the top of the figure, whereas scheduled delivery of data at layer 1 occurs in element 150 (non-blocking non-delaying switch). See Howe at col. 31 lines 14-45 and col. 4 lines 27-40 (explaining how this works) and FIG. 47 ("The added efficiency of 'headerless' packets"). As shown in FIG. 47, Layer 2 source and destination headers are removed at the originating edge node and added back on at the terminating edge node. Again, this requires special hardware and complexity, which is avoided by the claimed invention, which only requires coordination by the network endpoints and without modifying packets as they travel through the system.

All independent claims (claims 1, 10, 15, 21, and 26) have also been amended to recite that the packets are transmitted synchronously from the network endpoints. In contrast, in Howe packet transmission is only synchronized from the edge routers, not the network endpoints. See FIG. 2 of Howe. Consequently, the claims are distinguishable for this additional reason.

Dependent claims 7-9, 12-14, 18-20, and 23-25 have been amended to recite that synchronization occurs only between network endpoints and not among the network elements. See FIG. 8 and paragraph 40 of the present application (switches do not participate in scheduled delivery scheme). In contrast, Howe requires that all network elements be synchronized to a clock (see Howe FIG. 1 & 2, "master clock"), thus adding complexity and cost to the network. Thus, according to the claimed invention, conventional packet switches can be used to schedule packets between network endpoints without modifying the packet switches.

New dependent claims 27-31 further recite that the computer network comprises a plurality of network switches and wherein no schedule coordination occurs among the network switches. Consequently, these claims are even further distinguishable from the system of Howe.

Conclusion

Based on the foregoing, Applicant respectfully submits that the application is in condition for allowance. Should the Examiner believe that anything further is desirable in order to place the application in even better form for allowance, the Examiner is respectfully urged to contact Applicants' undersigned representative at the below-listed number.

Respectfully submitted,

BANNER & WITCOFF, LTD.

Dated this 16th day of October, 2007 By: /Bradley C. Wright/

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